REMARKS

Claims 23 and 25 through 30 are currently pending in the application.

This amendment is in response to the final Office Action of April 20, 2005.

35 U.S.C. § 112 Claim Rejections

Claims 23 and 25 through 30 are rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicant respectfully traverses this rejection, as hereinafter set forth.

In the previous amendment in the application, amendments to the specification were made for editorial purposes to clarify the claimed invention. Amendments to the specification adding paragraphs numbered {0013A], [0014A], [0015A], [0016A], and [0017A] are to provide a brief description of newly added drawing FIGS. 1A, 2A, 3A, 4A, and 5A while paragraphs numbered [0024A], [0028A], [0032A], [0033A], and [0037A] have been added to provide a description of the invention set forth in newly added drawing FIGS. 1A, 2A, 3A, 4A, and 5A. All newly added paragraphs to the specification and the newly added drawing figures provide a description of the invention set forth in currently pending claims 23 and 25 through 30 to comply with the provisions of 37 CFR § 1.83(a) as well as 35 U.S.C. § 112, first paragraph. Applicant asserts that all such amendments to the application clearly comply with the provisions of 35 U.S.C. § 132 as no new matter has been added to the application as such subject matter is contained in the original patent application serial number 08/609,354, filed March 1, 1996, which is a divisional of patent application serial number 08/089,166, filed July 7, 1993, now United States Patent 5,532,177. Applicant asserts that the description of the invention is clearly set forth in dependent claim 6 of the original patent application serial number 08/089,166 which states ". . . wherein said dopant concentration gradient increases with depth into said substrate" and dependent claim 9 thereof which states ". . . wherein said gradient increases with depth into said substrate, said etching having a rate which increases as the gradient decreases". Applicant asserts that the claims 23 and 25 through 30 clearly comply with the provisions of 35 U.S.C. §

132 as no new matter has been added to the application and clearly comply with the provisions of 35 U.S.C. § 112, first paragraph.

Claims 25 and 26 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Applicant has amended independent claim 25 to delete the phrase "a contaminated apex having an impurity concentration substantially the same as a portion of the single-layered substrate at the upper surface thereof" to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Therefore, presently amended claims 25 and 26 are allowable under the provisions of 35 U.S.C. § 112.

35 U.S.C. § 102(b) Anticipation Rejections/35 U.S.C. § 103(a) Obviousness Rejections

Anticipation/Obviousness Rejection Based on Bol (U.S. Patent No. 5,269,877)

Claims 23, 25, through 30 were rejected under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Bol (U.S. Patent 5,269,877).

Applicant asserts that a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Turning to the cited prior art, Bol discloses a process for making tip structures in conical or other shapes. (Col. 1, lines 44-45). The tip structures are produced on a substrate 10. Silicon is convenient but not necessary for the process. A 1.5-2.0 micron layer of amorphous silicon or polysilicon 12 with a surface 11 is deposited on substrate 10. (Col. 3, lines 15-19, FIG. 1). The amorphous silicon or polysilicon has a dopant concentration that is greatest at surface 11 and least at the interface between the amorphous silicon or polysilicon 12 and the substrate 10. (Col. 3, lines 20-25). Next, a nitride layer 16, 0.3-0.4 microns thick is deposited on the amorphous silicon or polysilicon 12. (Col. 3, lines 30-32). The next step is to pattern the nitride layer 16 and the amorphous silicon or polysilicon 12. This is done using a conventional photoresist process.

(FIG. 4, Col. 3, lines 37-39). After etching, the amorphous silicon or polysilicon 12 has tapered sidewalls due to the higher dopant concentration, which speeds up the etching process. (FIG. 5, Col. 3, lines 42-45). The amorphous silicon or polysilicon 12 is next oxidized to grow oxide bumpers 20. (FIG. 6). Fastest growth of oxide bumpers occurs at areas of highest dopant concentration. (Col. 3, lines 47-48, 53-55). Thus, oxide bumper 20 grows fastest and thickest near surface 11 of the amorphous silicon or polysilicon 12. Nitride layer 16 contributes to the final shape of oxide bumper 20. Because oxygen does not diffuse through the nitride layer 16, no oxide is grown on nitride layer 16. (Col. 3, lines 57-63). Fastest oxidation occurs just below interface 13 and decreases with decreasing dopant concentration. (FIG. 6, Col. 4, lines 4-6). The tip structure 22 includes base 24 and point 26. This tip structure 22 is formed as oxide bumper 20 grows. (Col. 4, lines 7-9). The final process step is removal of the oxide and nitride layers, leaving tip structure 22. Conventional process steps are used to remove the oxide and nitride layers. (Col. 4, lines 15-18).

After carefully considering the cited prior art, the rejections, and the Examiner's comments, Applicant asserts that the claimed invention clearly distinguishes over the cited prior art.

Applicant asserts that the claimed inventions of presently amended independent claims 23, 25, and 27 are not anticipated under 35 U.S.C. § 102 by the Bol reference because the Bol reference does not identically describe each and every element of the presently claimed inventions in as complete detail as is contained in the claims. For instance, Applicant asserts that the Bol reference does not describe the elements of the presently claimed inventions of independent claims 23, 25, and 27 calling for "an impurity offset from the apex of the at least one protuberance, said impurity within said protuberance having a concentration increasing concurrently with a distance from the apex", "a micro-cathode located in a portion of said substrate formed from the portion of the single-layered substrate further comprising . . . an increasingly contaminated body, the concentration of the impurity increasing from the contaminated apex", and "an emitter electrode located in a portion of said substrate, further comprising an apex having an etch-resistible quality that decreases with the distance from said apex".

In contrast to the presently claimed inventions of independent claims 23, 25, and 27, the Bol reference uses a multilayer substrate, not a single layer substrate. Such is not the presently claimed inventions of independent claims 23, 25 and 27. Therefore, presently amended independent claims 23, 25, and 27 as well as dependent claims 26 and 28 through 30 therefrom are allowable. Applicant asserts that the Bol reference contains no teaching or suggestion whatsoever to delete the layer 10. Applicant asserts that solely Applicant's disclosure is the basis for any such teaching or suggestion as the Bol reference is silent concerning any such teaching. As such, the Bol reference cannot and does not describe any such element of the claimed invention. Therefore, independent claims 23, 25, and 27 are allowable as well as dependent claims 26 and 28 through 30 therefrom.

Applicant requests entry of this amendment for the following reasons:

The amendment is timely filed.

\ The amendment places the application in condition for allowance.

The amendment does not require any further search or consideration.

In summary, Applicant submits that claims 23 and 25 through 30 are clearly allowable over the cited prior art.

Applicant requests the entry of this amendment, the allowance of claims 23 and 25 through 30, and the case passed for issue.

Respectfully submitted,

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